

Guide for Plant Fiber–Based Food Packaging Manufacturers

Determining if You Must Comply with Washington’s Restrictions

Overview

Washington’s prohibition on the manufacture, sale, or distribution of certain food packaging ([RCW 70A.222.070](https://app.leg.wa.gov/rcw/default.aspx?cite=70A.222.070)¹) prevents manufacturers from selling or distributing certain types of food packaging with per- and polyfluoroalkyl substances (PFAS) intentionally added to them.

This resource will help you understand if these restrictions apply to your product. It will also help you assess your supply chain and determine if any of your product’s components contain intentionally added PFAS.

The steps include:

- [Step 1: Determine if your product is included in the regulation.](#)
- [Step 2: Determine if your product contains intentionally added PFAS.](#)

Food packaging is intended for direct food contact and made from paper, paperboard, or other plant fiber materials. The term refers to the whole package or a part of the packaging.

PFAS are one or more fluorinated organic chemicals that contain at least one fully fluorinated carbon atom.

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¹ <https://app.leg.wa.gov/rcw/default.aspx?cite=70A.222.070>

Step 1: Determine if your product is included in the regulation and when

Is your product made from plant fiber–based materials?

Is it intended for direct food contact?

If the answer is **yes** to both questions, refer to the following dates for restrictions on each type of food packaging.

Prohibited February 2023

Wraps and liners: Includes sheets used to either wrap food or line other containers to act as an additional barrier.

Plates: Includes single or multi-compartment plates.

Food boats: Type of tray with tall, lipped edges and no compartment.

Pizza boxes.

Prohibited May 2024

Bags and sleeves: Includes flat-bottom bags and sealed-end bags (called sleeves or pinch-bottom bags).

Bowls: Also includes portion cups used to hold sauces.

Flat serviceware: Examples include shallow trays, cafeteria-style trays, and plates.

Open-top containers: Examples include food boats, French fry containers, and paper cones.

Closed containers: Examples include clamshells, food pails, bakery boxes, and deli containers.

Restrictions to be determined

We're currently assessing additional types of plant fiber–based food packaging that have intentionally added PFAS.

Follow our progress on our [PFAS in Food Packaging Alternatives Assessment webpage](#).²

Step 2: Determine if your plant fiber–based product contains PFAS

If you aren't sure if your products contain intentionally added PFAS, use the information below. This resource isn't prescriptive; we designed it to provide options to help you identify if you'll need to substitute product components.

² https://www.ezview.wa.gov/site/alias__1962/37610/pfas_in_food_packaging_alternatives_assessment.aspx

There are two main pathways to identify if the materials in your plant fiber–based food packaging are free of intentionally added PFAS: **disclosure** and **analytical testing**.

Disclosure

Transparency is the most effective way to identify if a product is compliant with current or future regulations. To determine if PFAS is intentionally added to any of the materials in your product, we suggest three options.

1. Ask suppliers for full material disclosure

If possible, ask for full material disclosure—a list of all the materials and substances in the components or material.

There are a number of chemical management platforms, transparency standards, and third-party consultants that can help you gather this information. They can help you identify any PFAS being intentionally used, provide additional details for you to assess compliance status for any regulations, and help you identify opportunities for future optimization.

What to look for: Review the list of chemicals provided for **fluoro-**. If you notice this wording, ask your supplier if that function is really necessary, or if they have alternative chemistries or materials that meet the necessary function. We recommend you also ask if the alternatives have robust chemical hazard assessments, to ensure that the alternatives are safer.

2. Ask suppliers to disclose if PFAS chemicals are added

If full material disclosure isn't possible, ask if any PFAS chemicals are added—they're commonly used for oil and grease resistance. Some PFAS can also be added to plastics that are then added to paper packaging.

- See [Appendix A](#) for PFAS the FDA approved for use in paper-based food packaging.
- See [Appendix B](#) for PFAS the FDA approved for use in plastics that may be used as part of paper-based food packaging.

3. Look for third-party certification of your materials

Some certifications can assess and certify both materials and final products. These certifications restrict certain toxic chemicals, require disclosure of ingredients, and assess the hazards of the ingredients.

For food packaging, look for materials that are certified by [Cradle to Cradle version 4.0](#)³ or [GreenScreen Certified version 1.0](#).⁴ Both of these certifications restrict the use of intentionally added PFAS.

³ https://www.c2ccertified.org/products/registry/search&category=packaging_paper/

⁴ <https://www.greenscreenchemicals.org/certified/products/category/food>

Analytical testing

If your suppliers don't provide the information you request, you can gather test data to assess if your product contains intentionally added PFAS. Before you test, we recommend you ask your supplier if they have test data that demonstrates the product doesn't contain intentionally added PFAS—they might have already assessed the material.

Certifications that restrict and test for PFAS

If your product is compostable, find out if the material you use is [Biodegradable Products Institute \(BPI\) certified](#).⁵ BPI requires testing of products for total fluorine; the results must be 100 parts per million (ppm) or less. **Products made from paper, paperboard, or other plant fiber materials with total fluorine below this limit are expected to be free of intentionally added PFAS. This limit might change over time.**

Lab data

You or your supplier can test the product or components for total fluorine. If the results are less than 100 ppm and quality control criteria are met, your product likely doesn't have intentionally added PFAS and would likely comply with the restrictions in plant-fiber based food packaging.

If you identify low levels of total fluorine, we recommend you talk with your suppliers—even if they are less than 100 ppm. This can:

- Confirm PFAS isn't intentionally added.
- Identify unintentional sources of PFAS so they can try to reduce or eliminate them.
- Identify sources of inorganic fluorine (which are not PFAS).

If you need to change your materials, we encourage you to go beyond compliance and seek out alternatives that are safer. If you need technical assistance or resources to find safer alternatives, contact us at SaferChem@ecy.wa.gov.

⁵ <https://products.bpiworld.org/>

Appendix A. FDA-approved PFAS for paper, paperboard, or plant pulp

These PFAS have all been approved by the FDA as additives to paper, paperboard, or plant pulp, or as manufacturing aids that can be used in paper and paperboard production.

Table 1: PFAS compounds, CAS numbers, and FCN or FCS numbers approved for use in paper, paperboard, or plant pulp that contact food.

PFAS compound	CAS registration number	FCN or FCS number
2-propenoic acid, 2-methyl-, 2- hydroxyethyl ester, polymer with 2-propenoic acid and 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl 2-methyl-2-propenoate, sodium salt	1878204-24-0	1676 ⁶
Copolymer of 2- (dimethylamino) ethyl methacrylate with 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl methacrylate, N-oxide, acetate	1440528-04-0	1493 ⁷
Siloxanes and silicones, methyl-phenyl, methyl-3,3,3-trifluoropropyl	1643944-25-5	1825 ⁸
2-propenoic acid, 2-methyl-, 2- hydroxyethyl ester, polymer with 2-propenoic acid and 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl 2-methyl-2-propenoate, sodium salt	1878204-24-0	1676 ⁶
Copolymer of 2- (dimethylamino) ethyl methacrylate with 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl methacrylate, N-oxide, acetate	1440528-04-0	1493 ⁷
2-Propenoic acid, 2-methyl-, 2- (dimethylamino)ethyl ester, polymer with 1-ethenyl-2- pyrrolidinone and 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl 2-propenoate, acetate	1334473-84-5	1451 ⁹ (1360 ¹⁰)
Butanedioic acid, 2-methylene-, polymer with 2-hydroxyethyl, 2- methyl-2-propenoate, 2-methyl- 2-propenoic acid and 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl 2-methyl-2- propenoate, sodium salt	1345817-52-8	1186 ¹¹

⁶ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=1676>

⁷ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=1493>

⁸ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=1825>

⁹ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=1451>

¹⁰ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=1360>

¹¹ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=1186>

PFAS compound	CAS registration number	FCN or FCS number
Hexane, 1,6-diisocyanato-, homopolymer, α -[1-[[[3-[[3 (dimethylamino)propyl]amino]propyl]amino]carbonyl]-1,2,2,2-tetrafluoroethyl]- ω -(1,1,2, 2,3,3,3-heptafluoropropoxy) poly[oxy(trifluoro(trifluoromethyl)-1,2-ethanediyl)]-blocked	1279108-20-1	1097 ¹²
2-propenoic acid, 2-methyl-, 2- hydroxyethyl ester polymer with 1-ethenyl-2-pyrrolidinone, 2- propenoic acid and 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl 2-propenoate sodium salt	1206450-10-3	1044 ¹³
2-propenoic acid, 2-methyl-, polymer with 2-(diethylamino)ethyl 2-methyl-2- propenoate, 2-propenoic acid and 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl 2-methyl-2- propenoate, acetate	1071022-26-8	1027 ¹⁴ (885 ¹⁵)
Diphosphoric acid, polymers with ethoxylated reduced Me esters of reduced polymerized oxidized tetrafluoroethylene ¹⁶	200013-65-6	962 ¹⁷ (416 ¹⁸ and 195 ¹⁹)
Hexane, 1,6-diisocyanato-, homopolymer, 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluoro-1-octanol-blocked	357624-15-8	940 ²⁰
2-propenoic acid, 2-methyl-, polymer with 2-hydroxyethyl 2-methyl-2-propenoate, α -(1-oxo-2-propen-1-yl)- ω -hydroxypoly(oxy-1,2-ethanediyl) and 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl 2-propenoate, sodium salt	1158951-86-0	933 ²¹

¹² <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=1097>

¹³ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=1044>

¹⁴ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=1027>

¹⁵ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=885>

¹⁶ This substance is also known as: phosphate esters of ethoxylated perfluoroether, prepared by reaction of ethoxylated perfluoroether diol (CAS Reg. No. 162492-15-1) with phosphorous pentoxide (CAS Reg. No. 1314-56-3) or pyrophosphoric acid (CAS Reg. No. 2466-09-3).

¹⁷ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=962>

¹⁸ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=416>

¹⁹ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=195>

²⁰ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=940>

²¹ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=933>

PFAS compound	CAS registration number	FCN or FCS number
2-propenoic acid, 2- hydroxyethyl ester, polymer with α -(1-oxo-2-propen-1-yl)- ω - hydroxypoly(oxy-1,2-ethanediyl), α -(1-oxo-2-propen- 1-yl)- ω -[(1-oxo-2-propen-1- yl)oxy]poly(oxy-1,2-ethanediyl) and 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl 2-propenoate	1012783-70-8	888 ²² (827 ²³)
2-Propenoic acid, 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl ester, polymer with α -(1-oxo-2-propen-1-yl)- ω - hydroxypoly(oxy-1,2- ethanediyl)	No CAS registration number given	820 ²⁴
2-propen-1-ol, reaction products with 1,1,1,2,2,3,3,4,4,5,5,6,6-tridecafluoro-6-iodohexane, dehydroiodinated, reaction products with epichlorohydrin and triethylenetetramine	464178-94-7	783 ²⁵ (746 ²⁶ and 542 ²⁷)
Copolymers of 2-perfluoroalkylethyl acrylate, 2-N,N-diethylaminoethyl methacrylate, glycidyl methacrylate, acrylic acid, and methacrylic acid	870465-08-0	646 ²⁸
Copolymer of 2-perfluoroalkylethyl acrylate, 2-(dimethylamino)ethyl methacrylate, and oxidized 2-(dimethylamino)ethyl methacrylate	479029-28-2	628 ²⁹
Copolymer of perfluorohexylethyl methacrylate, 2-N,N- diethylaminoethyl methacrylate, 2-hydroxyethyl methacrylate, and 2,2'-ethylenedioxydiethyl dimethacrylate, acetic acid salt	863408-20-2	604 ³⁰ (599 ³¹)
Copolymer of perfluorohexylethyl methacrylate, 2-N,N- diethylaminoethyl methacrylate, 2-hydroxyethyl methacrylate, and 2,2'-ethylenedioxydiethyl dimethacrylate, malic acid salt	1225273-44-8	604 ³⁰ (599 ³¹)

²² <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=888>

²³ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=827>

²⁴ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=820>

²⁵ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=783>

²⁶ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=746>

²⁷ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=542>

²⁸ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=646>

²⁹ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=628>

³⁰ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=604>

³¹ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=599>

PFAS compound	CAS registration number	FCN or FCS number
Perfluoropolyether dicarboxylic acid, ammonium salt	69991-62-4	538 ³² (398 ³³)
2-propen-1-ol, reaction products with pentafluoroiodoethane- tetrafluoroethylene telomer, dehydroiodinated, reaction products with epichlorohydrin and triethylenetetramine (CAS Reg. No 464178-90-3)	464178-90-3	518 ³⁴ (487 ³⁵ and 314 ³⁶)
Copolymers of 2-perfluoroalkylethyl acrylate, 2-N,N-diethylaminoethyl methacrylate, and glycidyl methacrylate	No CAS registration number given	338 ³⁷ (311 ³⁸ and 206 ³⁹)
3-cyclohexane-1-carboxylic acid, 6-((di-2-propenylamino)carbonyl)-,(1R,6R), reaction products with pentafluoroiodoethane-tetrafluoroethylene telomer, ammonium salts	No CAS registration number given	255 ⁴⁰
Fluorinated polyurethane anionic resin prepared by reacting perfluoropolyether diol (CAS Reg. No. 88645-29-8), isophorone diisocyanate (CAS Reg. No. 4098-71-9), 2,2-dimethylolpropionic acid (CAS Reg. No. 4767-03-7), and triethylamine (CAS Reg. No. 121-44-8)	328389-91-9	187 ⁴¹
Glycine, N,N-bis[2-hydroxy-3-(2-propenyloxy)propyl]-, monosodium salt, reaction products with ammonium hydroxide and pentafluoroiodoethane-tetrafluoroethylene telomer	220459-70-1	59 ⁴²

³² <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=538>

³³ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=398>

³⁴ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=518>

³⁵ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=487>

³⁶ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=314>

³⁷ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=338>

³⁸ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=311>

³⁹ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=206>

⁴⁰ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=255>

⁴¹ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=187>

⁴² <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=59>

Additional FDA-approved PFAS for paper, paperboard, or plant pulp

Table 2: Additional PFAS compounds and CFR numbers approved for use in paper, paperboard, or plant pulp that contact food.

PFAS compound	CFR number
Chromium (Cr III) complex of N-ethyl - N -heptadecylfluoro- octane sulfonyl glycine containing up to 20 percent by weight of the chromium (Cr III) complex of heptadecylfluoro- octane sulfonic acid may be safely used as a component of paper for packaging dry food when used in accordance with prescribed conditions	21 CFR 176.160 ⁴³
Undecafluorocyclohexanemethanol ester mixture of dihydrogen phosphate, compound with 2,2' iminodiethanol (1:1); hydrogen phosphate, compound with 2,2'- iminodiethanol (1:1); and P,P'- dihydrogen pyrophosphate, compound with 2,2'- iminodiethanol (1:2); where the ester mixture has a fluorine content of 48.3 pct to 53.1 pct as determined on a solids basis	21 CFR 176.170 ⁴⁴

PFAS used as a processing aid in paper or paperboard manufacture

This PFAS is approved as a processing aid in paper and paperboard manufacturing. It can be used in the production of some types of paper or paperboard food packaging and could be found in the final product.

Table 3: PFAS compound, CAS number, and FCN number as a processing aid for paper or paperboard manufacture.

PFAS compound	CAS registration number	FCN number
Siloxanes and silicones, methyl-phenyl, methyl-3,3,3-trifluoropropyl	1643944-25-5	1825 ⁴⁵

⁴³ <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm?fr=176.160>

⁴⁴ <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/cfrsearch.cfm?fr=176.170>

⁴⁵ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=1825>

Appendix B. PFAS approved for use in plastics

These PFAS are approved for use in plastics that contact food. It's possible that plastic may be used as a coating on paper or paperboard.

If you use or make plastic-coated paper or paperboard, you may want to confirm with your suppliers that these PFAS aren't added to plastics during the manufacturing process.

PFAS used as coatings

These PFAS could be used to coat materials used to make some types of paper or paperboard food packaging.

Table 4: PFAS compounds and CFR numbers for PFAS used as coatings.

PFAS compound	CFR number
Polyvinyl fluoride resins	21 CFR 175.270 ⁴⁶
Polytetrafluoroethylene (PTFE)	21 CFR 175.300 ⁴⁷
Chlorotrifluoroethylene resins	21 CFR 177.1380 ⁴⁸
Chlorotrifluoroethylene-1,1-difluoroethylene copolymer resins	21 CFR 177.1380 ⁴⁸
Chlorotrifluoroethylene-1,1-difluoroethylene-tetrafluoroethylene copolymer resins	21 CFR 177.1380 ⁴⁸
Ethylene-chlorotrifluoroethylene copolymer resins	21 CFR 177.1380 ⁴⁸

⁴⁶ <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfCFR/CFRSearch.cfm?fr=175.270>

⁴⁷ <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfCFR/CFRSearch.cfm?fr=175.300>

⁴⁸ <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfCFR/CFRSearch.cfm?fr=177.1380>

PFAS used as processing aids in plastics that could be used as coatings

These PFAS are approved as processing aids in plastics. They can be used to make some types of paper or paperboard food packaging.

Can be used in all approved plastics

Table 5: PFAS compounds, CAS numbers, and FCN or FCS numbers for approved plastics used as processing aids.

PFAS compound	CAS registration number	FCN or FCS number
2,3,3,4,4,5,5-Heptafluoro-1-pentene polymer with ethene and tetrafluoroethene	94228-79-2	1601 ⁴⁹
Vinylidene fluoride-hexafluoropropene copolymer	9011-17-0	1560/1448 ⁵⁰
1-Propene,1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene (modified with a halogenated ethylene)	9011-17-0	736 ⁵¹

Can be used in approved polyolefins (includes plastics like polypropylene and polyethylene)

Table 6: PFAS compounds, CAS numbers, and CFR or FCN numbers for approved polyolefins used as processing aids.

PFAS compound	CAS registration number	CFR or FCN number
Polyvinylidene fluoride homopolymer	24937-79-9	21 CFR 177.1520 ⁵²
Vinylidene fluoride-hexafluoropropene copolymer	9011-17-0	21 CFR 177.1520 ⁵²
Vinylidene fluoride-hexafluoropropene copolymer	9011-17-0	21 CFR 177.1520 ⁵²
Tetrafluoroethylene-hexafluoropropylene-vinylidene fluoride copolymers	25190-89-0	260 ⁵³

⁴⁹ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=1601>

⁵⁰ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=1560>

⁵¹ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/?set=FCN&id=736>

⁵² <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfCFR/CFRSearch.cfm?fr=177.1520>

⁵³ <https://www.cfsanappsexternal.fda.gov/scripts/fdcc/index.cfm?set=FCN&id=260>

Can be used in approved ethylene-vinyl acetate plastics

Table 7: PFAS compounds, CAS numbers, and CFR numbers for approved ethylene-vinyl acetate plastics used as processing aids.

PFAS compound	CAS registration number	CFR number
Copolymer of vinylidene fluoride and hexafluoropropene	9011-17-0	21 CFR 177.1350 ⁵⁴
PTFE	N/A	21 CFR 177.1350 ⁵⁴

⁵⁴ <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfCFR/CFRSearch.cfm?fr=177.1350>